



# ACCELERATED TESTING FOR STUDYING PAVEMENT DESIGN AND PERFORMANCE (FY 2001)

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By

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## RESEARCH

### Introduction

This paper presents the results of research funded by the Midwest States Accelerated Testing Pooled Fund Program. Participating states include Iowa, Kansas, Missouri and Nebraska. The experiment was conducted at the Civil Infrastructures Systems Lab at the Kansas State University.

### Project Objective

The objective of the first phase of this research was to compare the performance of a permeable bound granular base with that of a semi-permeable unbound granular base under portland cement concrete (PCC) pavements using full-scale accelerated testing. The second phase compared the efficiency of fiber-reinforced polymer (FRP) dowels to that of steel dowels when used to retrofit damaged non-doweled joints in PCC pavements.

### Project Description

Two PCC pavements were constructed and subjected to a full-scale accelerated pavement test. One pavement had a permeable granular base and the other a semi-permeable base. Both pavements and bases were fully instrumented to record temperature, moisture, soil pressure and strain. Water was periodically spread at the surface of the pavements to simulate the effect of rainfall, induce the accumulation of water in the base and to allow the comparison of the drainage capability and the structural performance of the two base types. After 300,000 cycles, the joints and cracks in the semi-permeable base pavement were retrofitted with 1.5 inch FRP dowels and one inch steel dowels to re-establish the load transfer and another 25,000 passes were applied.

### Project Results

The measured stresses and strains as well as the distresses observed on the two pavements clearly indicated a better performance for the permeable granular base. The pavement with the semi-permeable base exhibited severe cracking and pumping of fines from the base and subgrade. The steel dowels were observed to give a better performance than the RFP dowels in the second part of the experiment.

### Report Information

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